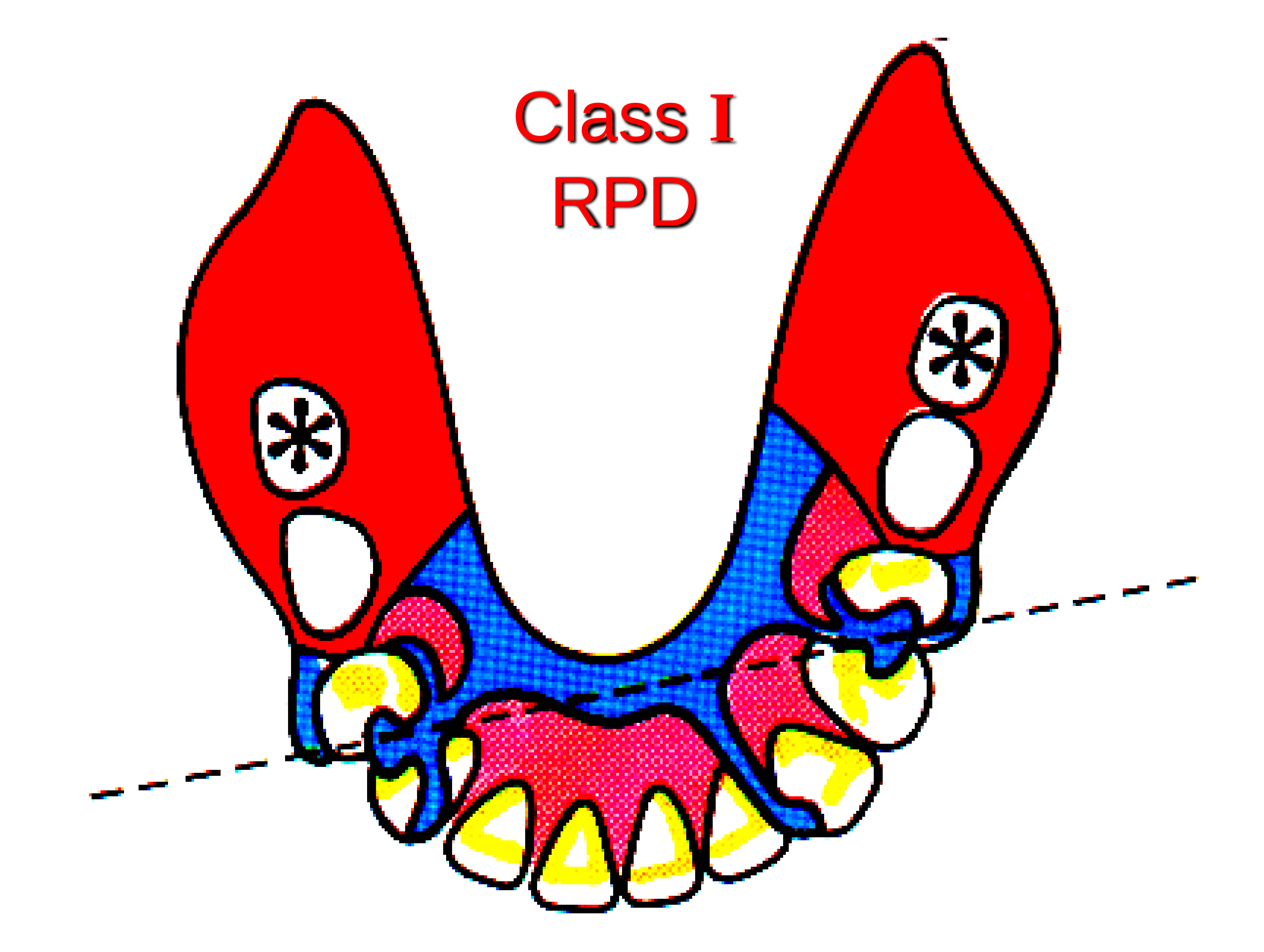
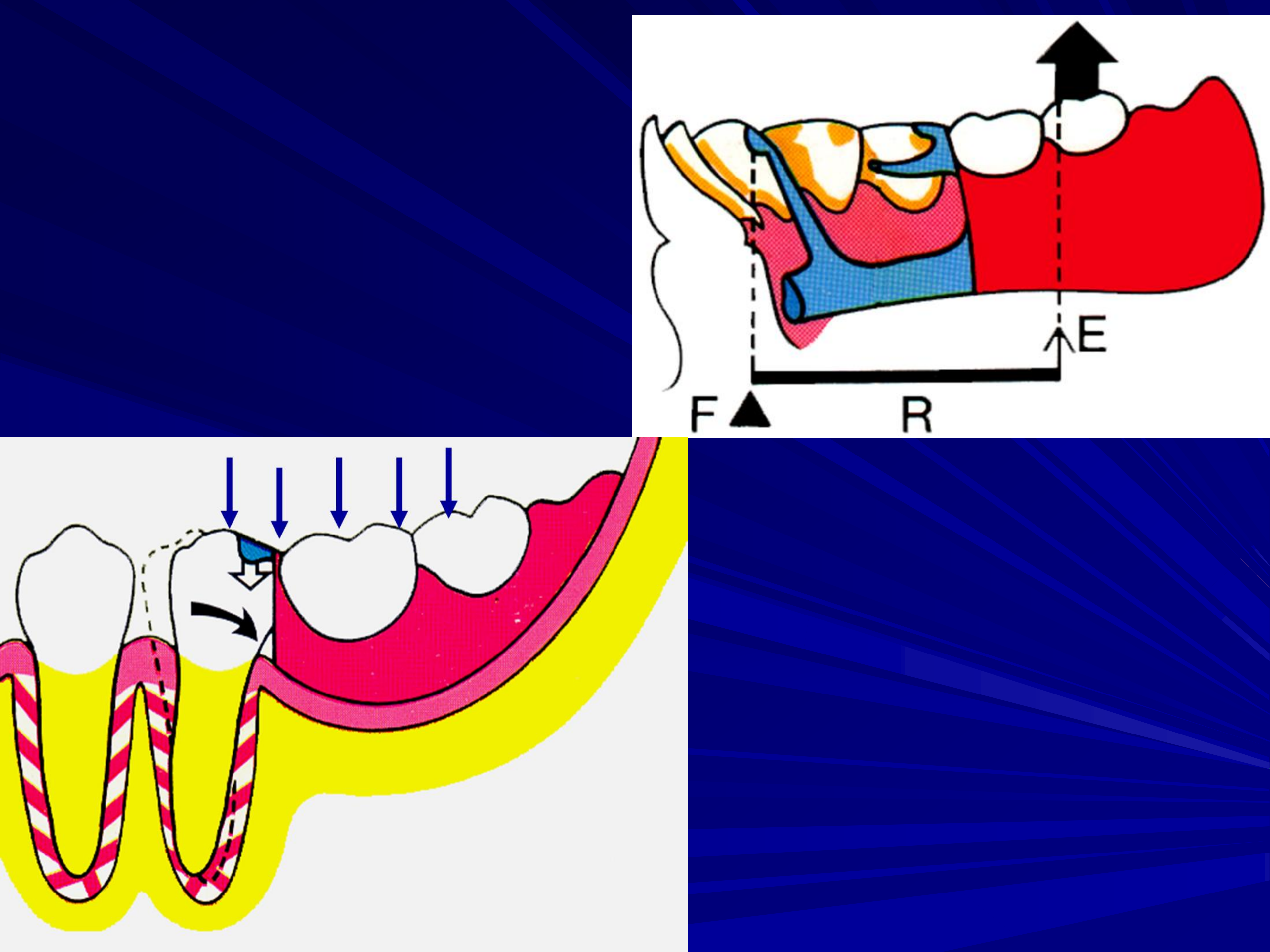
Essentials of Removable Partial Denture Design

Class I Kennedy design


Class I
RPD

Problems of support associated with bilateral free-end saddles is due to:

1. Lack of posterior abutment
2. Support is derived from both the residual ridge and abutment teeth
3. Major support is obtained from the residual ridge
4. If resorption occurs and relining of the denture is neglected further bone resorption occurs with subsequent torque acting on the abutments


E
F
R

Problem of distal extension bases

Can be reduced by:

I- Reduction of the load

II- Distribution of load between abutment teeth and residual ridge

III- Wide distribution of the load

IV- Providing posterior abutment

I- Reduction of the load

This can be achieved by:

1- Maximum extension of the denture base

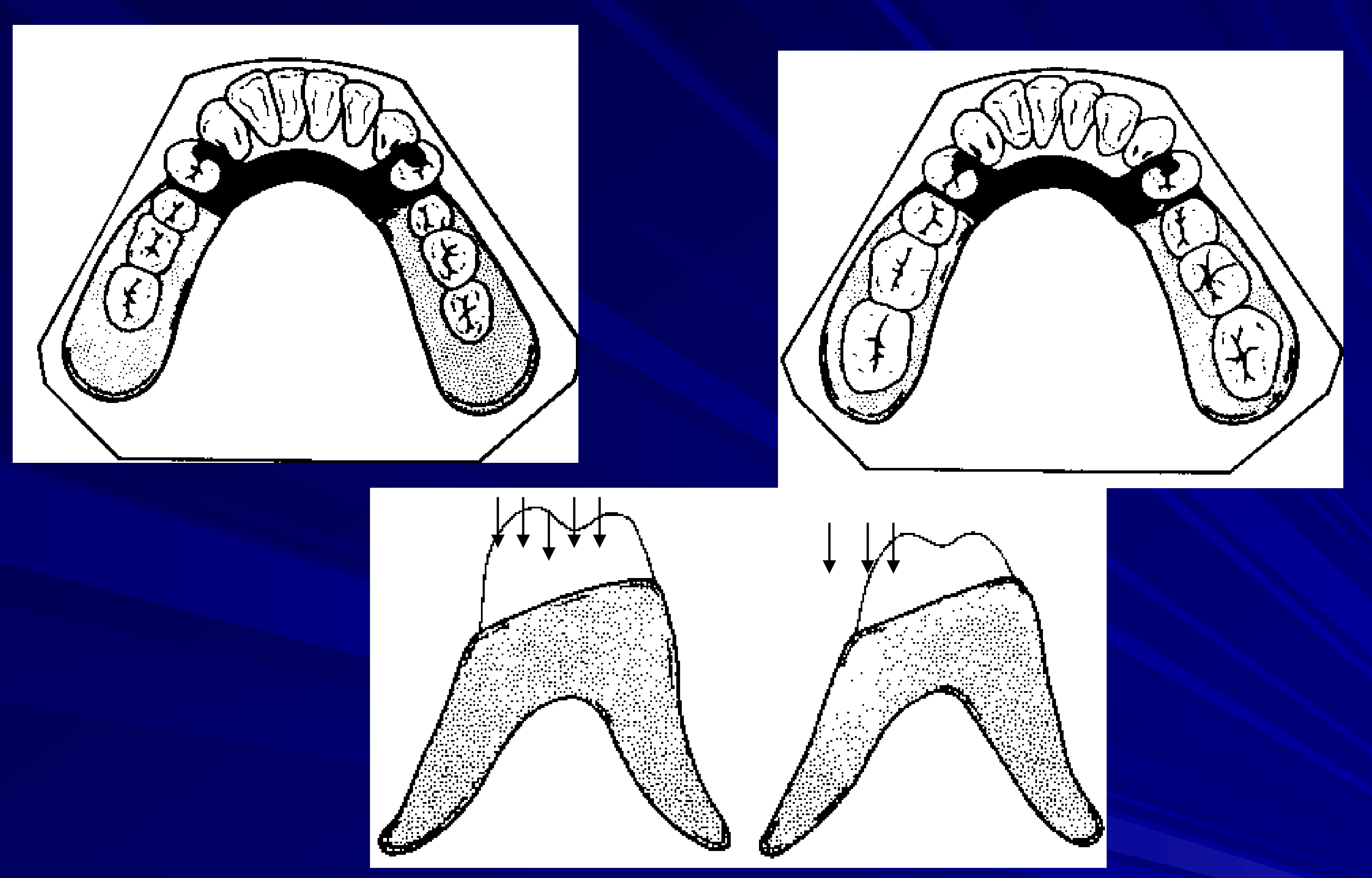
2- Decreasing the size of occlusal table width BY:

a- using canines and premolars instead of premolars and molars

b- using narrow teeth

c- leaving a tooth off the saddle

3- Developing harmonious occlusion and reduce the cusp angle



Total occlusal load applied may be reduced by using comparatively smaller posterior teeth

less muscular force will be required to penetrate food bolus with reduced occlusal table, thereby reducing forces to supporting oral structures

II- Distribution of load between abutment teeth and residual ridge

Can be achieved by:

1- Varying connection between clasp and saddles by:

   A- Stress breakers

   B- Combining rigid connection and bar clasps

   C- Combining rigid connection and occlusally approaching flexible clasps

2- Anterior placement of occlusal rests

3- Muco-compression impression technique

1- Varying the connection between clasps and saddles

A- Stress breaker

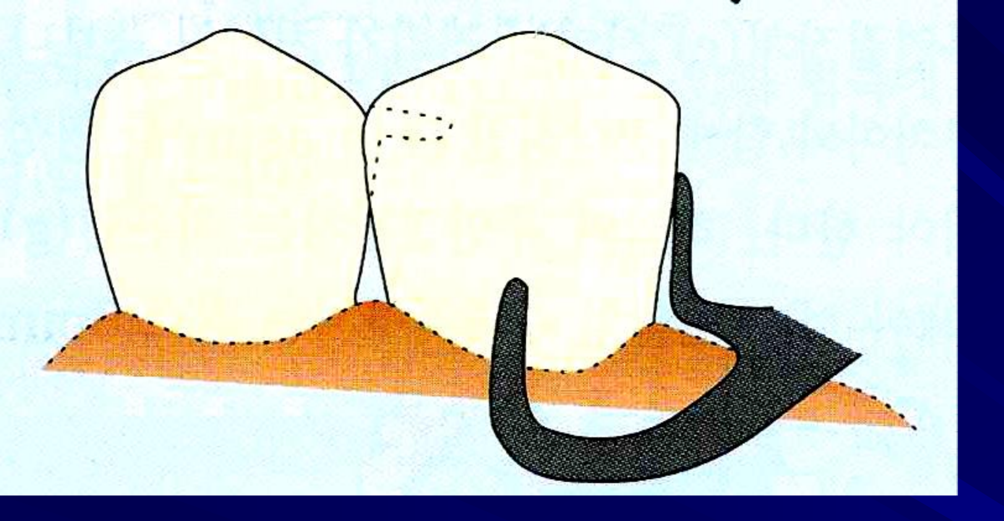
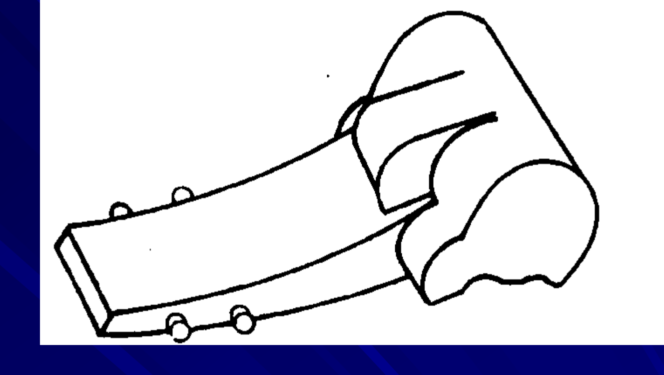
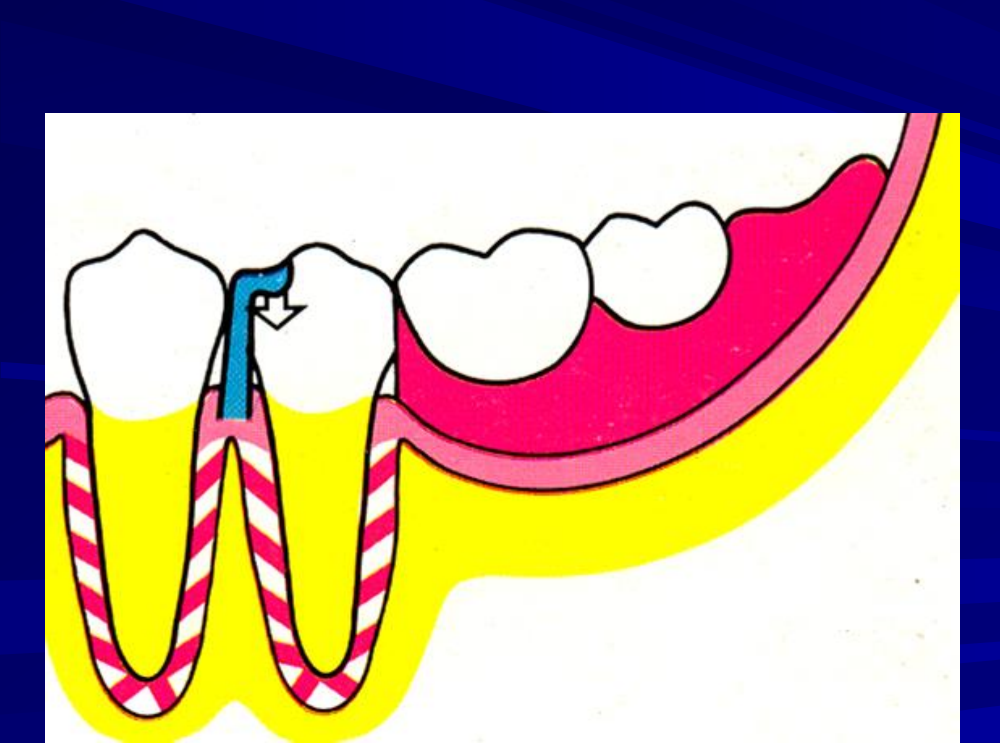
It is a device which allows some movement between saddle and retaining unit. RIDGE is subjected to increased load, TEETH receive less stresses

B- Combining rigid connection and bar clasps (gingival approach):

Bar clasp is flexible, under occlusal load the flexible bar clasp moves gingivally into a shallower undercut

C- Combining rigid connection and occlusally approaching wrought wire clasps :

Occlusally approaching clasps made of wrought wire is flexible and allows some movement over the tooth


2- Anterior placement of occlusal rests

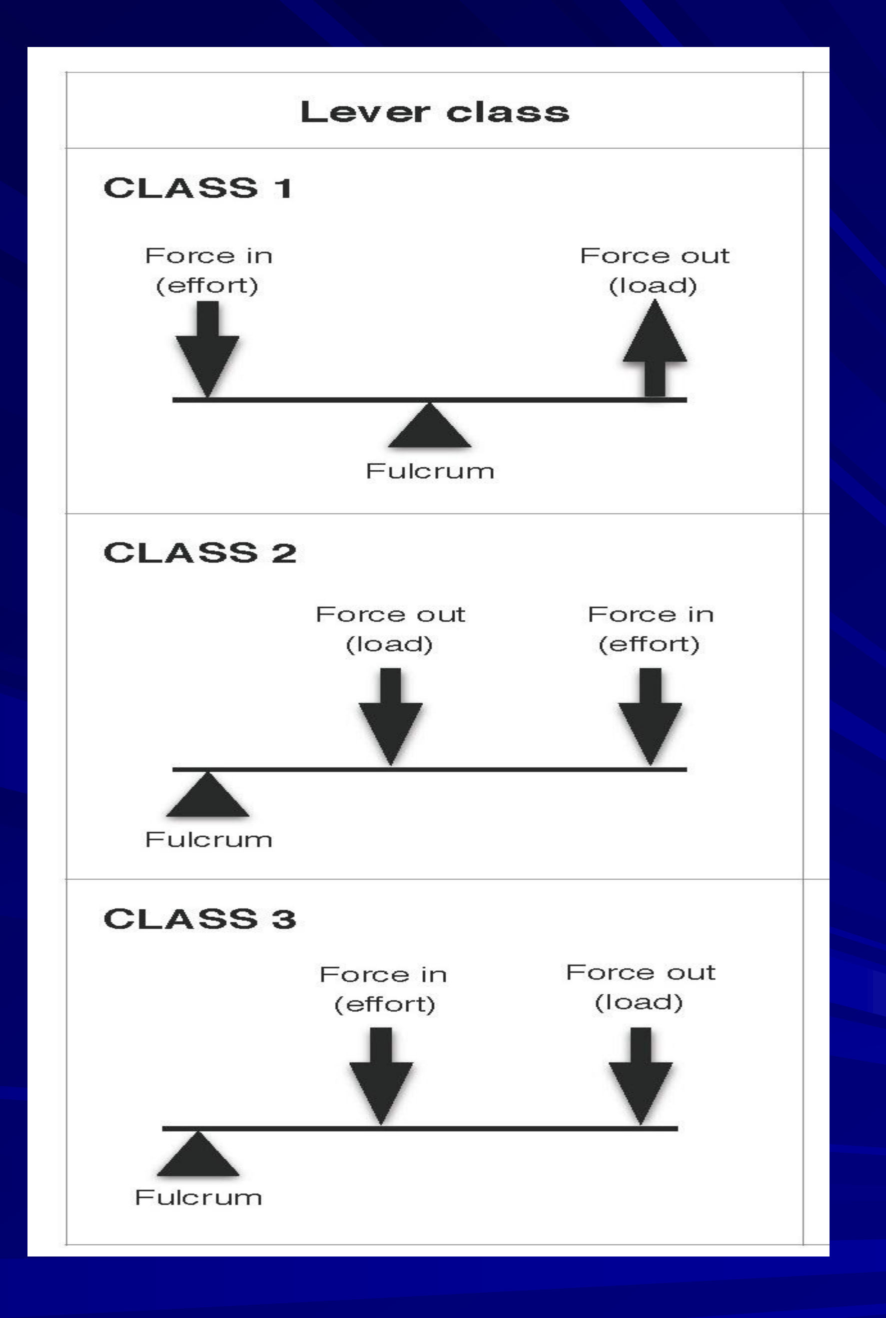
It distributes the occlusal load between abutment and residual ridge

ACHIEVED BY changing the stresses from lever class I to lever class II (favorable)

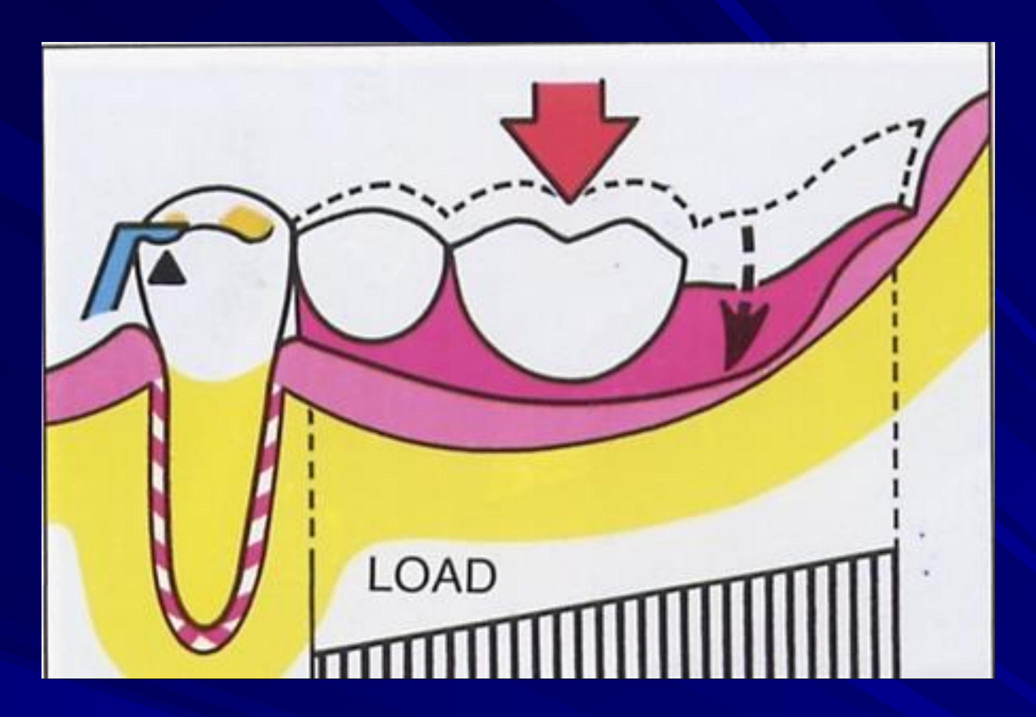
a- greater load is born by the ridge and lesser load on abutment

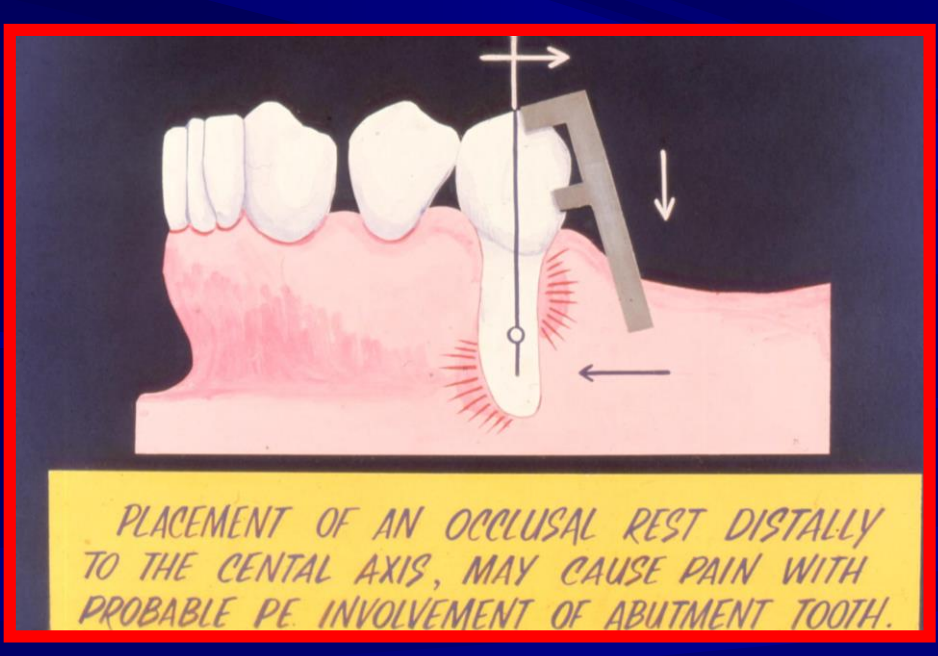
B- bone near the abutment will share the distal part of ridge in bearing the occlusal load

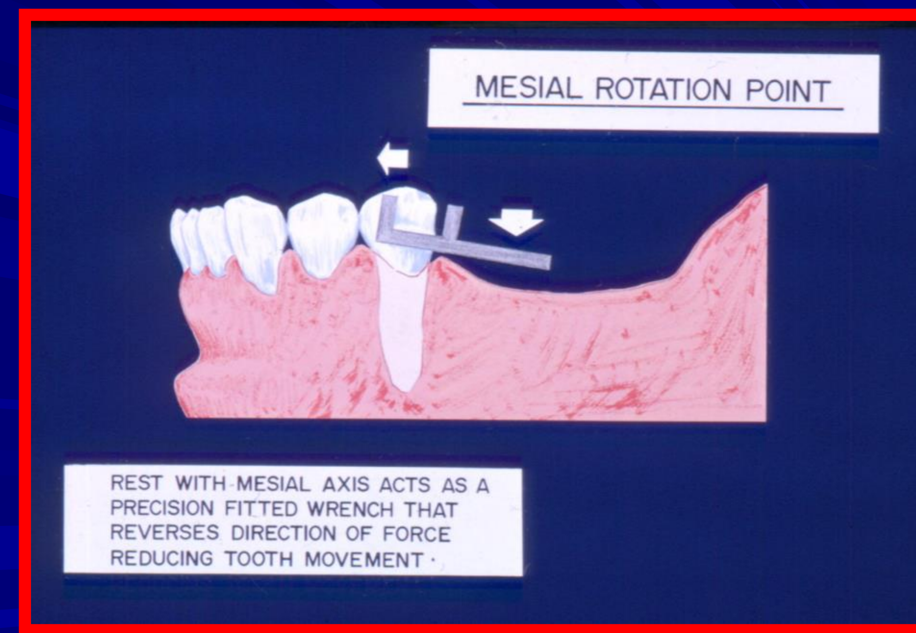
C- change the direction of torque to mesial side where the neighboring teeth resist the torque



Lever class
CLASS 1
Force in
(effort)
Force out
(load)
Fulcrum
CLASS 2
Force out
(load)
Force in
(effort)
Fulcrum
CLASS 3
Force in
(effort)
Force out
(load)
Fulcrum


LOAD


PLACEMENT OF AN OCCLUSAL REST DISTALLY TO THE CENTAL AXIS, MAY CAUSE PAIN WITH PROBABLE PE INVOLVEMENT OF ABUTMENT TOOTH.


MESIAL ROTATION POINT
REST WITH MESIAL AXIS ACTS AS A PRECISION FITTED WRENCH THAT REVERSES DIRECTION OF FORCE REDUCING TOOTH MOVEMENT.

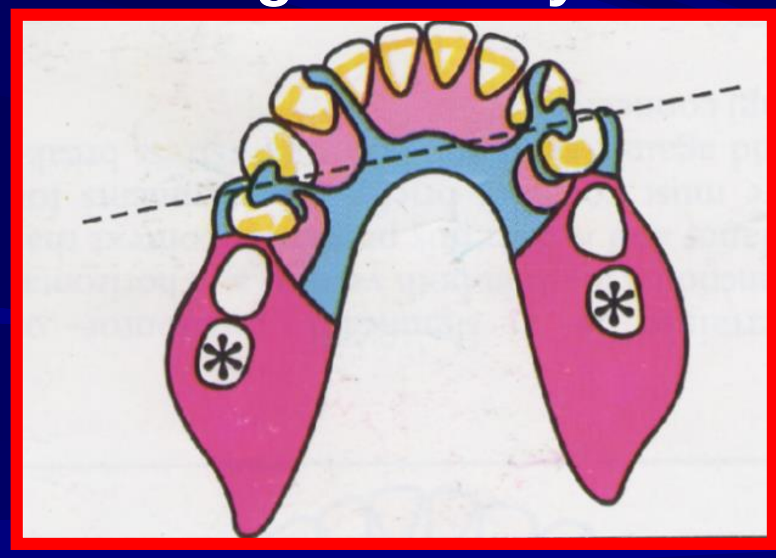
3- By muco-compression (functional impression techniques)

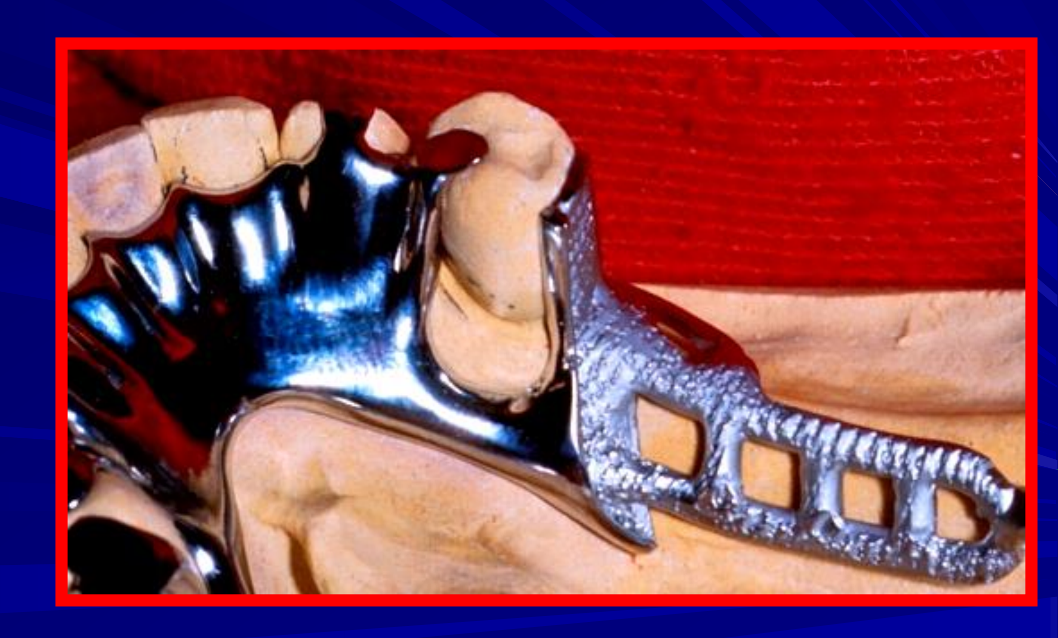
- Functional impression techniques
- Functional relining after denture construction

III- Wide distribution of the load

Achieved by:

- Maximum coverage, the broader the coverage, the greater the distribution of the load
- Placing additional rests, embrasure hooks or splinting
- Using Kennedy bar





IV-Providing posterior abutments

This can be achieved by:

- Using implants
- Saving the posterior tooth as much as possible

DESIGNING KENNEDY CLASS I

Design for support

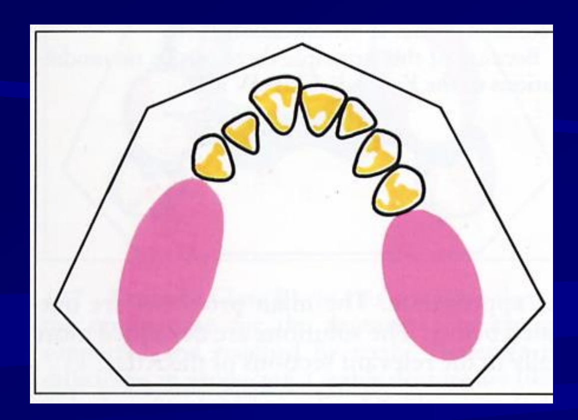
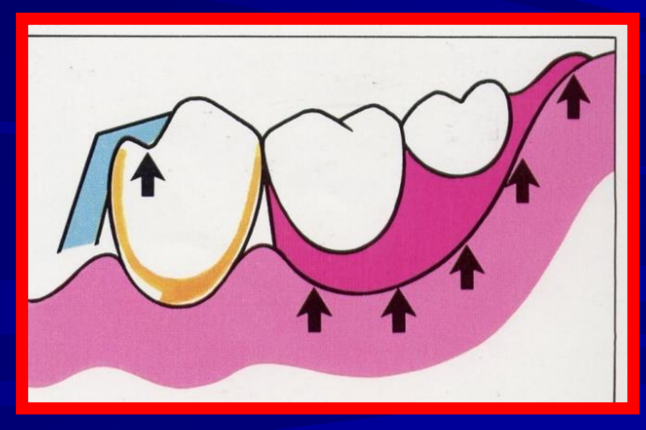
A- Denture base

B- Rests

C- Maxillary major connector

Denture base

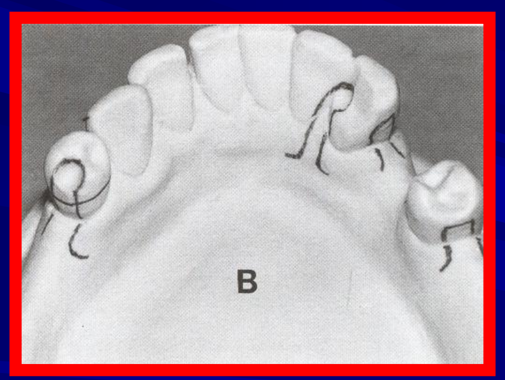
- Combination between metal and acrylic resin to allow future relining
- Should be of maximum coverage
- Should be constructed over muco-compressive impression technique
- The base is in the form of meshwork or ladder-like

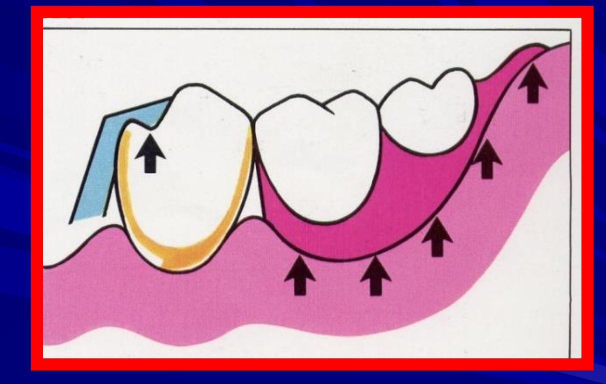




Rests

- Should be placed mesially
- Saucer conventional shaped rest seats
- Number of rests should be (3 or more)
- Ball rest is indicated in distally extended saddle where canine is last abutment









Maxillary major connector

- Palatal strap or palatal plate major connectors
- Maximum support is needed in class I partial denture which is achieved through maximum coverage according to the number of missing teeth in the form of palatal strap or palatal plate

Design for connection

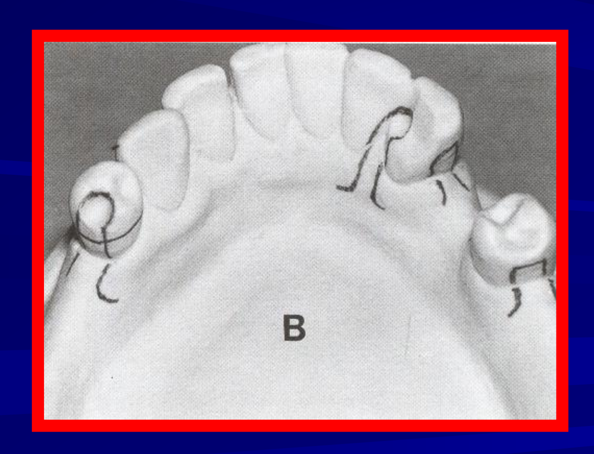


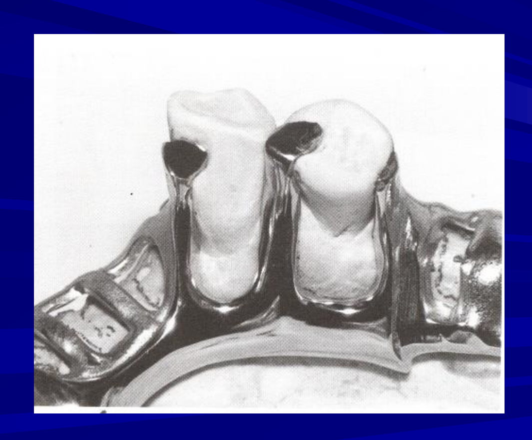
Minor connector

Major connector

Minor connector

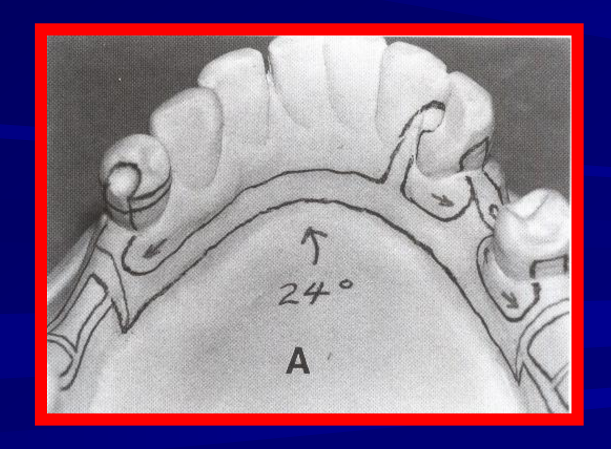
- It connects clasp or indirect retainer to saddle or major connector
- It must be rigid
- It touches the tooth on guiding planes
- It crosses the gingival margin in a perpendicular direction
- It must be relieved as it crosses the gingival margin



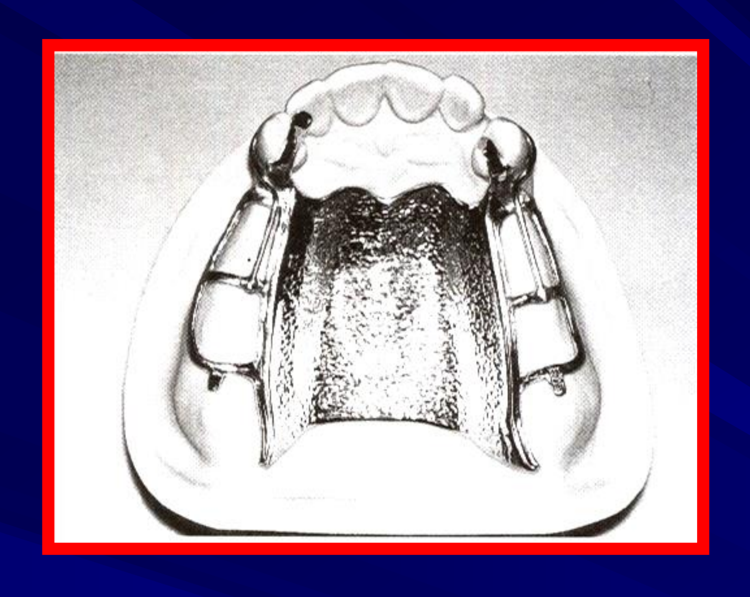


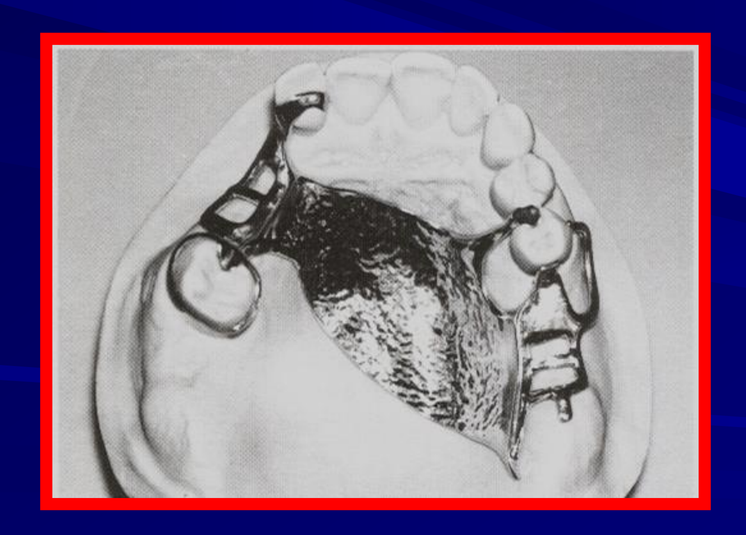
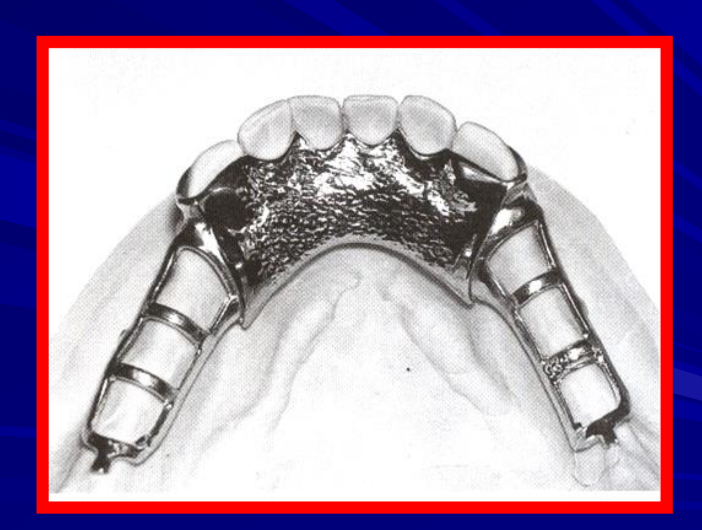
Major connectors

- Maximum coverage according to number of missing teeth.(palatal strap or palatal plate)
- Antro-posterior palatal bar is less indicated because of its less rigidity
- In mandibular class I lingual bar is used because of its simplicity, limited coverage and patients tolerance
- Lingual plate is used when rigidity and indirect retention is needed







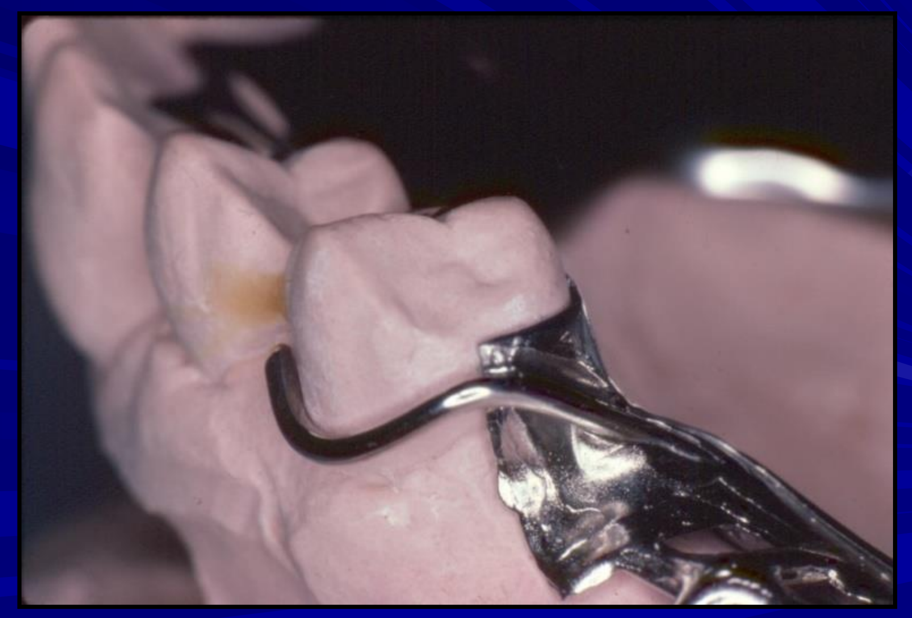



Design for retention

Direct retention

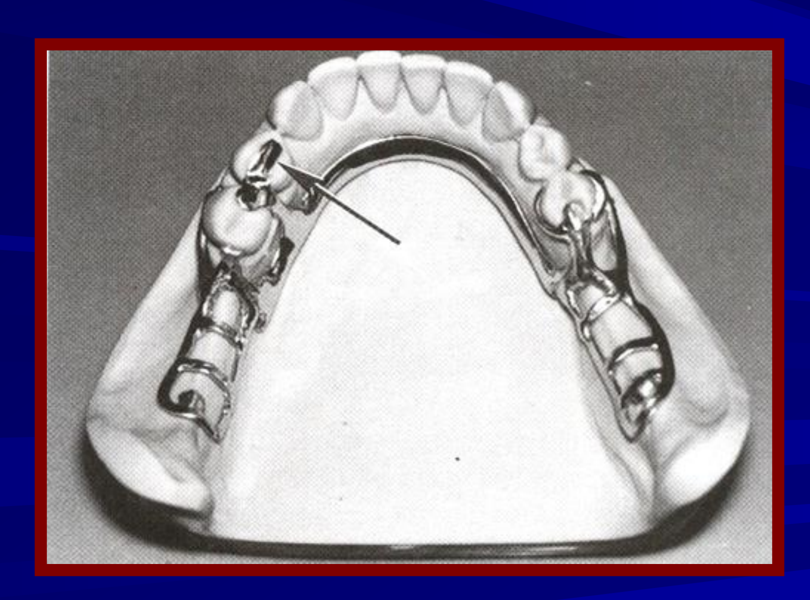
- Flexible clasp must be used to avoid torque on the abutment
- R.P.I. Or R.P.A. fulfill the needed requirement
- Distobuccal undercut, bar clasp is indicated
- Mesiobuccal undercut, wrought wire clasp

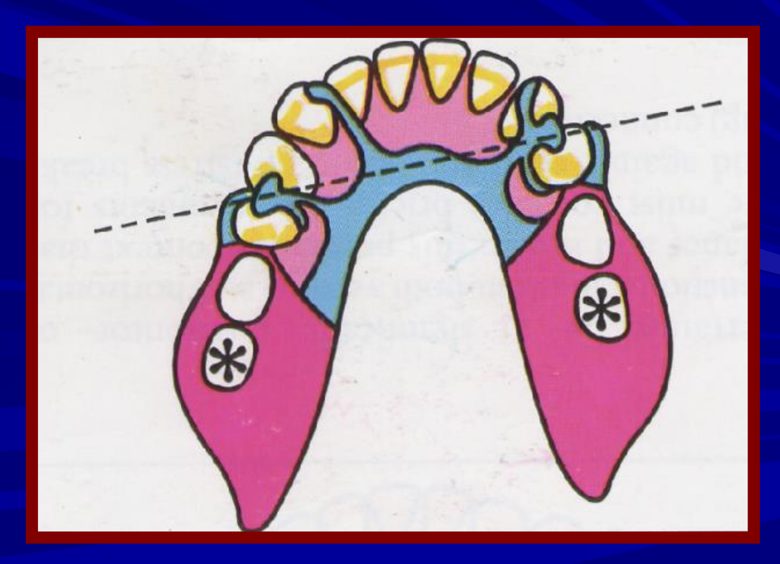


Indirect retention

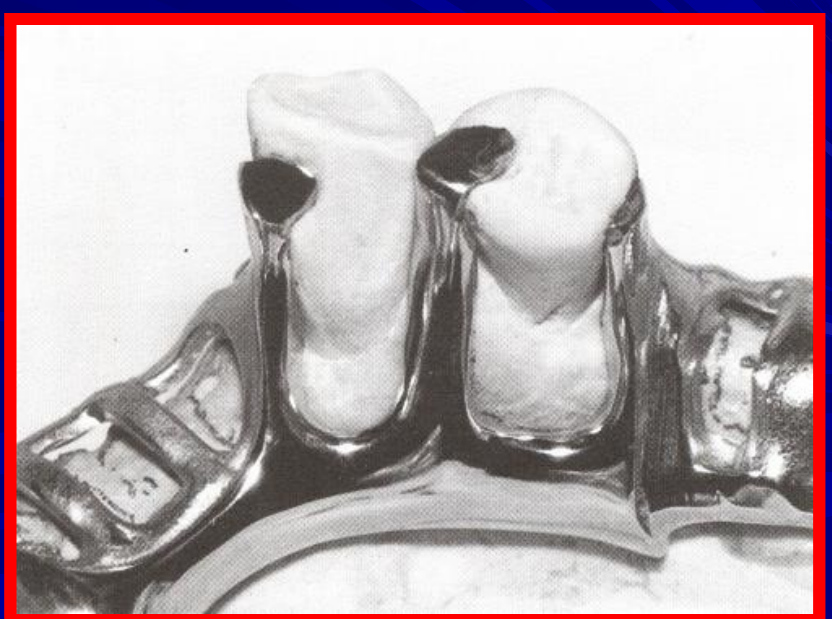
- Through rests or rigid components extend to the other side of fulcrum line
- It should be as far anterior to F.L. as possible and perpendicular to it
- The best position for indirect retention is the mesial of the first premolar tooth





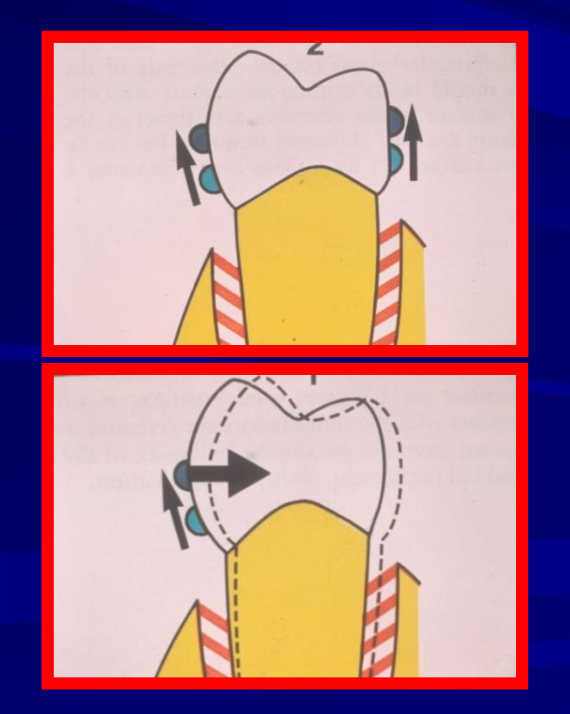
Design for bracing

- Maximum tissue coverage
- Minor connectors
- Vertical slopes of major connectors
- Reducing cusp height
- Reducing occlusal table width
- Balanced occlusion

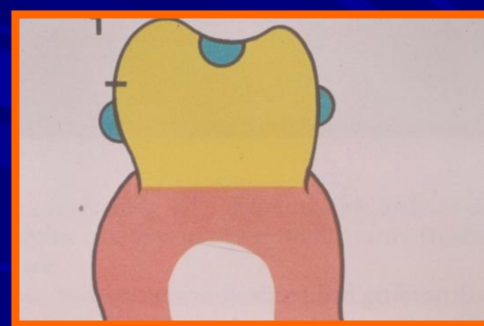


Design for reciprocation

Any retentive clasp arm must be opposed by a reciprocal arm to counteract the damaging force exerted on the abutment by the retentive clasp arm

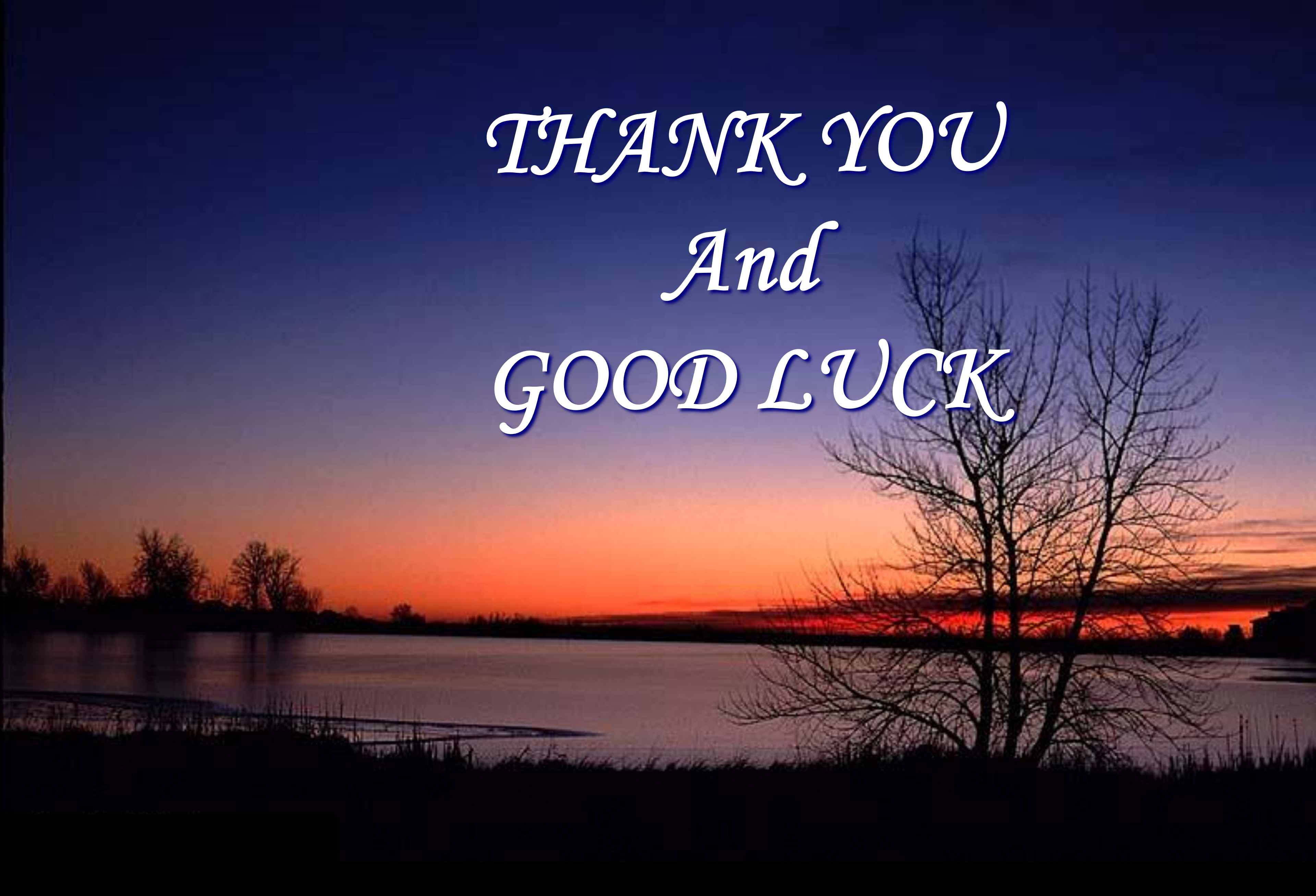






Artificial teeth and occlusion

- Smaller acrylic teeth and narrow bucco-lingually
- Teeth should exhibit sharp cutting edges
- Lower teeth should be placed over the crest of the ridge to enhance denture stability
- The buccal cusp over the buccal turning point of the ridge crest
- Centric occlusion of teeth should coincide with centric relation
- Simultaneous bilateral contacts of opposing posterior teeth
- Avoid contact of the anterior teeth in protrusion
- Artificial posterior teeth should not be arranged distally than the beginning of sharp upward incline of residual mandibular ridge or over the retromolar pad


THANK YOU
And
GOOD LUCK


Temporary Tooth
Replacement


(a)
(b)


b